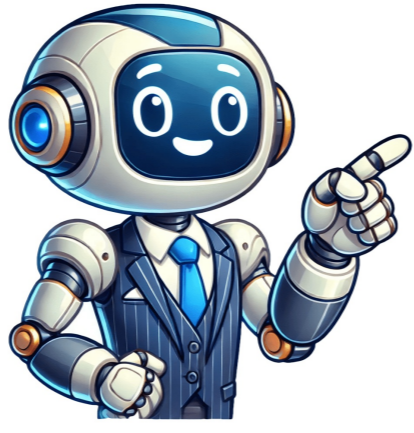


Click to verify































"nonsense" and recommends using two right or left lenses from the 3D glasses to cut out the "pointy, pointy 3D stereoscopic vision", although this technique also improves the huge brightness loss from a 3D film.[103] Versions of these "Z-D glasses" are being marketed.[104] As pointed out in the article "Virtual Space - the movies of the future"[105][failed verification] in real life the 3D effect, or stereoscopic vision, depends on the distance between the eyes, which is only about 2+1⁄2 inches. The depth perception this affords is only noticeable near to the head - at about arms length. It is only useful for such tasks as threading a needle. It follows that in films portraying real life, where nothing is ever shown so close to the camera, the 3D effect is not noticeable and is soon forgotten as the film proceeds. Director Christopher Nolan has criticised the notion that traditional film does not allow depth perception, saying "I think it's a misnomer to call it 3D versus 2D. The whole point of cinematic imagery is it's three dimensional... You know 95% of our depth cues come from occlusion, resolution, color and so forth, so the idea of calling a 2D movie a '2D movie' is a little misleading."[106] Nolan also criticised that shooting on the required digital video does not offer a high enough quality image[107] and that 3D cameras cannot be equipped with prime (non-zoom) lenses.[106] Late film critic Roger Ebert repeatedly criticized 3D film as being "too dim", sometimes distracting or even nausea-inducing, and argued that it is an expensive technology that adds nothing of value to the film-going experience (since 2-D films already provide a sufficient illusion of 3D).[108] While Ebert was "not opposed to 3-D as an option", he opposed it as a replacement for traditional film, and preferred 2-D technologies such as MaxVision48 that improve image area/resolution and frames per second.[108] Most 3D systems will cut down the brightness of the picture considerably - the light loss can be as high as 88%. Some of this loss may be compensated by running the projector's bulb at higher power or using more powerful bulbs.[109] The 2D brightness cinema standard is 14 foot-lamberts (48 candela per square metre), as set by the SMPTE standard 196M. As of 2012[update], there is no official standard for 3D brightness. According to the industry de facto standard, however, the "acceptable brightness range" goes as low as 3.5 fL (12 cd/m2) - just 25% of the standard 2D brightness.[110] Among others, Christopher Nolan has criticized the huge brightness loss: "You're not that aware of it because once you're 'in that world,' your eye compensates, but having struggled for years to get theaters up to the proper brightness, we're not sticking polarized filters in everything."[111] In September 2012, the DCI standards body issued a "recommended practice" calling for a 3D projection brightness of 7 fL (24 cd/m2), with an acceptable range of 5–9 fL (17–31 cd/m2).[12] It is not known how many theaters actually achieve such light levels with current technology. Prototype laser projection systems have reached 14 fL (48 cd/m2) for 3D on a cinema screen.[3] Main article: 2D to 3D conversion Another major criticism is that many of the films in the 21st century to date were not filmed in 3D, but converted into 3-D after filming. Filmmakers who have criticized the quality of this process include James Cameron (whose film Avatar was created mostly in 3D from the ground up, with some portions of the film created in 2D,[112]) and is largely credited with the revival of 3D) and Michael Bay.[100] However, Cameron has said that quality 2D to 3D conversions can be done if they take the time they need and the director is involved.[113] Cameron's Titanic was converted into 3D in 2012, taking 60 weeks and costing \$118 million. In contrast, computer-animated films for which the original computer models are still available can be rendered in 3D easily, as the depth information is still available and does not need to be inferred or approximated. This has been done with Toy Story, among others.[114] Film portal Cinematography Digital cinema List of 3D films (1914–2004) List of 3D films (2005–present) 2D to 3D conversion Depth perception Stereoscopic Autostereoscopic 3D display 3D television 4D film Volumetric display 3-D Film Preservation Fund Motion capture Stereoscopic video game Surround sound Digital 3D Disney Digital 3-D Reaid 3D Dolby 3D Xpand 3D MasterImage 3D IMAX 3D 4DX ^ Goldberg, Matt (April 6, 2018). "3D Is Dead (Again)". Collider. ^ "animation | History, Movies, Television, & Facts". Britannica. Retrieved April 18, 2022. ^ a b Mills, Virginia (August 13, 2018). "180 years of 3D". Royal Society. Retrieved January 16, 2023. ^ Bulletins de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique (in French). Hayez. 1849. ^ Pellerin, Denis (October 13, 2017). "The Quest for Stereoscopic Movement: Was the First Film ever in 3-D?". International Journal on Stereo & Immersive Media. 1 (1). 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Pictured here is a 4DX theater. 4D film is a presentation system combining motion pictures with synchronized physical effects that occur in the theater. Effects simulated in 4D films include motion, vibration, scent, rain, mist, bubbles, fog, smoke, wind, temperature changes, and strobe lights.[1]2 Seats in 4D venues vibrate and move. As of 2022, 4D films have been exhibited in more than 65 countries.[3] 4D motion pictures are also exhibited in theme parks.[4] The term "4D film" is an extension of 3D film, which gives the illusion of three-dimensional solidity.[5] Precursors of the modern 4D film presentation include Sensurround, which debuted in 1974 with the film Earthquake. Only a few films were presented in Sensurround, and it was supplanted by Dolby Stereo in 1977, which featured extended low frequencies and made subwoofers a common addition to cinema.[6] Other notable efforts at pushing the boundaries of the film viewing experience include Fantasound, the first use of stereo sound; Cinemiracle and Cinerama, both wide-screen formats utilizing multiple projectors; and Smell-O-Vision. The Sensorium is regarded as the world's first commercial 4D film and was first screened in 1984 at Six Flags Power Plant in Baltimore. It was produced in partnership with Landmark Entertainment.[7] 4DX, D-Box Technologies, and Mediamation all currently integrate 4D technology in global stadium seating multiplexes.[8] The following is a list of 4D presentation systems developed for traditional film theatres. Overview of 4D providers Format Date Developer 3D format Motion seat Effects Remarks Notes 4DX CJ 4D Plex Stereoscopic 3D yes motion, vibration, scent/olfactory, water sprays, wind/air, snow, fog, strobes, lightning, bubbles Paramount, Showcase 4D E-Motion Lumma Stereoscopic 3D yes motion, vibration, scent/olfactory, water sprays, wind/air, snow, fog, strobes, lightning, bubbles (Not named by developer) Red Rover Stereoscopic 3D yes motion, water sprays, wind/air, scent/olfactory, fog, strobes, bubbles, Branded as Super 4D in Lotte Cinema installations. Title Year Release venue/Country Notes The Sensorium 1984 Six Flags Power Plant, Baltimore, MD The first 4D film Captain EO 1986 Epcot, Disneyland, Disneyland Paris and Tokyo Disneyland Closed in the mid-late 1990s and reopened in 2010 as a tribute to the late Michael Jackson. Muppet\*Vision 3D 1991 Disney's Hollywood Studios Directed by Jim Henson Honey, I Shrunk the Audience 1994 Epcot, Disneyland, Disneyland Paris and Tokyo Disneyland Sponsored by Kodak, closed in all locations in May 2010 and was replaced with Captain EO. Terminator 2 3D: Battle Across Time 1996 Universal Studios Japan Directed by James Cameron Pirates 4D 1997 SeaWorld Ohio, Busch Gardens Williamsburg, Thorpe Park in the UK, Busch Gardens Tampa Bay Produced by Busch Entertainment, Directed by Keith Melton. PandaDroom 2002 The Efteling, Netherlands Same film released in other parks without 4D effects SpongeBob SquarePants 4-D 2002, 2006 Six Flags over Texas, Moody Gardens, Shedd Aquarium, Adventure Dome, Six Flags Great Adventure, Movie Park Germany, Adventure Aquarium, Kings Dominion, (formerly at Paramount Parks), Indianapolis Zoo, Carowinds, Camden Aquarium (Camden, NJ), Flamingo Land Theme Park and Zoo and other locations Mickey's PhilharMagic 2003 Magic Kingdom, Hong Kong Disneyland, Tokyo Disneyland, and Disney California Adventure. In collaboration with Walt Disney Feature Animation Haunted House[a] 2003 Flamingo Land Theme Park and Zoo Shrek 4-D 2003 Universal Studios Florida, Universal Studios Japan, and Universal Studios Singapore Released in an anaglyph version as Shrek 3-D on DVD Borg Invention 2004 Star Trek: The Experience, at Las Vegas Hilton, US Closed in 2008, to be reopened in Neonopolis, Las Vegas Fly Me to the Moon 2008 Six Flags over Texas Journey to the Center of the Earth 4-D Adventure 2008 Vibrant 5D, Raipur, India Stone Mountain Park, Dollywood, Warner Bros. Movie World Fly High: The Legend of Black Man 2017 India First Indian 4D film; directed by Rahul Rathish Kumar Avatar in 4D 2009 South Korea, Hong Kong in 4DX, James Cameron, Director London Eye 4D Experience 2009 London Eye Produced by Centre Screen Productions and Principal Large Format Beyond All Boundaries 2009 WWII Museum, New Orleans Produced by Tom Hanks ENERGIA The Spirit of the Earth 2009 Cité de l'énergie, Shawinigan (Quebec) Spectators are seated on a revolving platform. Features wind, snow, smoke, rain, vibration and lighting effects. "The Garden" 2010 USA Pavilion at Expo 2010 The eight-minute film was projected upon five 10-meter-high screens. Marvel Super Heroes 4D 2010 Madame Tussauds London, Trans Studio Bandung[10] Rabid Rider 2010 Cincinnati Zoo & Shaleam 2011? Jerusalem Time Elevator, Jerusalem A 3000-year-old guide to Jerusalem's history at the Jerusalem Time Elevator, Jerusalem.[11] The Bourne Legacy 2012 Multinational In 4DX Tallgrass Prairie: Tides of Time 2012 Flint Hills Discovery Center, Manhattan, Kansas Features wind, snow, smoke, and lightning effects[12] Prometheus 2012 Cinepolis Galerías Guadalajara, Mexico in 4DX. Ridley Scott, Director Titanic 2012 Multinational 4DX re-release.[13] James Cameron, Director The Adventures of Tintin 2011 Nickelodeon Resorts, Paramount Parks, North Carolina Zoo, and Alton Towers 14-minute condensed version of the film. Iron Man 3 2013 Korona World Theatre Nagoya, Japan.[14] Seoul, South Korea Labeled as 4DX featuring strobe lights, tilting seats, blowing wind and fog, and odor effects. 47 Ronin 2014 Multinational In 4DX Fury 2014 Multinational In 4DX Interstellar 2014 Multinational In 4DX. Christopher Nolan, Director Rio 2014 San Diego Zoo, Kentucky Kingdom, North Carolina Zoo, Indianapolis Zoo, Cincinnati Zoo 12-minute condensed version of the film. Temple Run 7D 2014 India 9-minute ride to various Indian temples including Kedarnath, Badrinath, Gangotri, Rameshwaram, and Dwarka produced by Modern Techno Projects Private Ltd. Happy Feet Multinational [15] Star Wars: The Force Awakens 2015 Multinational In 4DX. J.J. Abrams, Director Ice Age: No Time for Nuts 4D 2015 United States 4D-remastered version of the 2006 short film of the same name. Rogue One 2016 Multinational In 4DX Batman v Superman: Dawn of Justice 2016 Seoul, Korea and New York City, New York Labeled as 4DX including fog, wind, motion, rain, lightning, vibrations and scents. Pixels 2016 Taegu, Philippines 4DX re-release including models, sprites, explosives, and bullets. Mass Effect: New Earth 4D 2016 California's Great America 4+1⁄2-minute film, 60-foot screen with 4K resolution, live performers, wind, water, leg pokers, neck ticklers, 80-channel surround sound LEGO Nexo Knights 4D: The Book of Creativity[16] 2016 Legoland parks and Legoland Discovery Centre parks worldwide 12+1⁄2-minute 4D film of LEGO Nexo Knights shown at Legoland, along with the LEGO Movie 4D Produced by Alexander Lentjes[17] for G2Ffilm and Merlin Entertainments Gravity 2018 Multinational 4DX re-release.[18] Alfonso Cuarón, Director Life of Pi 2018 Multinational 4DX re-release.[19] Ang Lee, Director 1917 2019 Multinational In 4DX.[20] Sam Mendes, Director, Produced by Amblin Partners Star Wars: The Rise of Skywalker 2019 Multinational In 4DX. J.J. Abrams, Director Gemini Man 2019 Multinational In 4DX. Ang Lee, Director The Lion King 2019 Multinational In 4DX. Jon Favreau, Director Inception 2020 Multinational 4DX re-release.[21] Christopher Nolan, Director The Matrix Resurrections 2021 Multinational In 4DX. Lana Wachowski, Director Top Gun: Maverick 2022 Multinational In 4DX. Directed by Joseph Kosinski. The Super Mario Bros. Movie 2023 Multinational In 4DX. Aaron Horvath, Michael Jelenic Directors Tom and Jerry The Movie 2022 Multinational [22] SCOOB 2023 Multinational [23] DC League of Super Pets 2023 Multinational [24] Scrooge: A Christmas Carol 2023 Multinational [25] Oppenheimer 2023 Multinational In 4DX. Christopher Nolan, Director[26] Postcard from Earth 2023 Sphere at the Venetian Resort, Las Vegas Effects include wind, scents, and infrasound seat vibrations. Directed by Darren Aronofsky.[27] Godzilla Minus One 2023 Japan In 4DX. Directed by Takashi Yamazaki[28] 4DX Simulator ride ^ Also known as R. L. Stine's Haunted Lighthouse 4-D) ^ Archived atGhostarchive and the Wayback Machine: "4DX Cinemas Next Generation - Motion Seats, Wind, Fog, Lighting, Bubbles, Water & Scents". YouTube. ^ Archived at Ghostarchive and the Wayback Machine: "Smelly Screens & Moving Seats At The UK's First 4DX Cinema | Swipe". YouTube. ^ "4DX Continues to Dominate The 4D Marketplace by Inking Deal with Cineplex Germany". CinemaToday. 2019-04-01. Retrieved 2022-03-27. ^ "Weekly Top 10: The World's Best Theme Park Movie Attractions". Theme Park Insider. Retrieved 2022-03-27. ^ "Watch: First 4D Theater Opens in the U.S.". Time. June 24, 2014. Retrieved December 13, 2023. ^ Hauersley, Thomas (May 25, 2011). "...in Sensurround". In 70mm. Retrieved October 23, 2017. ^ Zone, Ray (2012). 3-D Revolution: The History of Modern Stereoscopic Cinema. The University Press of Kentucky, pp. 143–155. ISBN 978-0-8131-3611-0. Archived from the original on 2017-10-23. Retrieved 2017-10-23. ^ Maddox, Gary (October 7, 2011). 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